NATIONAL SCIENCE FOUNDATION
ARLINGTON, VA 22230

Engineering Directorate
Office of Industrial Innovation

Report of the Advisory Committee for Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs

24-26 January 2006

1.0 INTRODUCTION

The National Science Foundation (NSF) Advisory Committee (AdCom) for the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs met January 24-26 2006 at NSF Headquarters facility in Arlington, VA in Conference Room 375.

Advisory Committee members in attendance were:

Dr. Sudhir Bhagwan
Dr. Chris Busch
Ms. Trish Costello
Dr. Edward Getty
Mr. Albert Johnson
Dr. Karen Kerr
Mr. Tom Knight
Mr. Richard Paul
Ms. Penny K. Pickett
Mr. Michael Sheridan
Dr. David B. Spencer
Dr. E. Jennings Taylor (Chairman)
Dr. Carole A. Teolis
Ms Meg Wilson

Advisory Committee member absent: Dr. Lizette Velazquez

NSF representatives attending all or part of the meeting included:

Dr. Errol Arkilic, SBIR Program Manager
Dr. Ian Bennett, SBIR Program Manager
Dr. Richard Buckius, Acting Assistant Director, Engineering
Dr. Juan E. Figueroa, SBIR Program Manager
Dr. Joe Hennessey, Senior Advisor, SBIR Program
Dr. Kesh Narayanan, Acting Director, Office of Industrial Innovation
Dr. Sara B. Nerlove, SBIR Program Manager
Dr. Mike Reischman, Deputy Assistant Director, Engineering Directorate
Dr. T. James Rudd, SBIR Program Manager
Dr. Rosemarie D. Wesson, SBIR Program Manager
Dr. George Vermont, SBIR Expert

NSF Technical Assistants:

Mr. Chris Kerestes
Ms. Tocarra Boyd
Mr. Shawn Stingel
Ms. Ann Robertson
Mr. David Chen

NSF Triumph Technologies SBIR/STTR Project Team

Ms. Sonya Lucas
Ms. Carla Lucas
Mr. Joe Schweitzer
Ms. Michelle Wood
Ms. Terria Davis
Ms. Shellion Walker

Other Participants and Attendees:

Mr. Neil MacDonald, Editor of Federal Technology Week

2.0 ACTIVITIES SUMMARY

Tuesday, 24 January 2006

2.1 INTRODUCTION AND WELCOME

Kesh Narayanan opened the meeting and introduced Mike Reischman (NSF Deputy Assistant Director, Engineering Directorate).

Mike Reischman addressed the AdCom, and described the NSF organization and the Engineering Directorate's role in it. He discussed briefly the plan to re-organize the Engineering Directorate and the elevation of the Office of Industrial Innovation to a Division of Industrial Innovation and Partnerships reporting directly to the ENG Assistant Director (AD).

Sonya Lucas distributed and explained the Conflict of Interest documentation. Said documentation was distributed to the AdCom members for review and signature.

Kesh Narayanan asked NSF representatives and AdCom members present to introduce themselves and to give brief background statements.

Jennings Taylor asked for discussion and/or motion to approve the report from the previous meeting. Meg Wilson made a motion and David Spencer seconded the motion to approve the previous meeting minutes. The previous meeting report was unanimously approved by voice vote.

The meeting agenda was divided into four topical areas

1. Strategy
2. Innovation
3. Partnerships
4. Outcomes

The final section of this report provides the AdCom's comments and recommendations.

2.2 STRATEGY

SBIR/STTR Strategy Update

Kesh Narayanan presented an update of the Office of Industrial Innovation (OII) Strategic Plan. A full copy of the OII Draft Strategic Plan was provided to the AdCom members prior to the meeting. The broad goals of the OII Strategic Plan were revised and include:

I. Innovation Partnerships at the Frontier Goal
II. Innovation Partnerships to Accelerate Commercialization Goal
III. Globally Competitive Science and Engineering Workforce Goal
IV. Operational Excellence Goal

Kesh Narayanan presented the specific plans associated with these goals. In the OII Strategic Plan, tasks are associated with the specific plans and ownership is assigned to OII staff.

Input for NSF 2006 - 2011 Strategic Plan

The SBIR/STTR AdCom prepared input for the NSF 2006 - 2011 strategic plan in the format requested at the website below. This input is presented in the attachment to this report.

http://www.nsf.gov/about/performance/input.cfm

Office of Industrial Innovation Website Demonstration

Kesh Narayanan and Joseph Schweitzer, Data Specialist, demonstrated the new Office of Industrial Innovation website.

Operation (Phase I CAP, STTR Phase I $, Phase IIB)

Joe Hennessey, Senior Advisor, presented operational issues and proposals related to

1. Phase I Commercialization Assistance Program
2. Increasing the Funding Level of Phase I STTR Proposals
3. Permitting flexible submission of Phase IIB Proposals

Additionally, Joe Hennessey presented a new Phase II Commercialization Plan template based on previous discussions with and input from the AdCom.

Indirect Cost Analysis and Recommendation

Carol Orlando, Team Leader Cost Analysis and Audit Resolution, and Andrea Kline, Grant and Agreement Specialist, discussed the NSF role in indirect cost analysis. OII suggested that a single indirect rate with a base of direct salary/wages and a limit on said rate be placed on the indirect rate for SBIR/STTR proposals.

2.3 INNOVATION

University-Industry Partnerships (ENG AdCom Request)

Jennings Taylor, Dick Paul and Albert Johnson introduced a discussion regarding the role of OII and/or ENG in promoting university-industry partnerships. The SBIR/STTR AdCom is charged with reporting to the ENG AdCom the recommendations of the SBIR/STTR AdCom.

Innovation: Global, National, NSF, OII (Response to NSF Strategy)

Jennings Taylor, Kesh Nayaranan, and Juan Figueroa, Program Manager, lead a discussion regarding the formulation of the SBIR/STTR AdCom response to the NSF Draft Strategic Plan.

The formal meeting adjourned at approximately 6:30 PM on this date.

Wednesday, 25 January 2006

2.4 PARTNERSHIPS

Phase II Grantees Conference Planning

Rose Wesson and Errol Arkilic, Program Managers, provided an update regarding the planning for the Phase II Grantees conference.

Kauffman Foundation (Partnership with NSF)

Lesa Mitchell, Vice President Kauffman Foundation introduced the Kauffman Foundation activities to the SBIR/STTR AdCom and suggested ways for OII and Kauffman to partner.

MIT Enterprise Forum® (Partnership with NSF)

Joe Hadzima, Chairman of the MIT Enterprise Forum® introduced the Enterprise Forum activities to the SBIR/STTR AdCom and suggested ways for OII and the Enterprise Forum to partner.

Phase II Mentoring

Mike Sheridan and Errol Arkilic, Program Manager, presented OII plans for Phase II mentoring.

MatchMaker (Partnership SBIR/Industry/Investors)

Ed Getty and James Rudd, Program Manager presented an update on MatchMaker.

2.5 OUTCOMES, ASSESSMENT AND COMMUNICATION

AC/GPA (NSF Outcomes and Assessment)

Dave Spencer shared his experience regarding the Advisory Committee for GPRA Performance Assessment (AC/GPA). Jennings Taylor was also recently appointed to the AC/GPA.

Posters (Publicity)

Chris Kerestes, Technical Assistant presented examples of proposals highlighting SBIR/STTR projects.

SBIR/STTR Outcomes: Assessment and Communication)

George Vermont, Expert, and Joe Hennessey briefed the SBIR/STTR AdCom regarding the status of the assessment of outcomes for Phase II/IIB projects. Individuals from 119 projects were interviewed,

of which 40% were deemed successful. Of those who were not successful, the reported reasons were split equally between issues around technology and market.

Joe Hennessey recommended that the required reporting that is to happen five years subsequent to the completion of the Phase II/IIB project will be handled through this assessment.

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Beginning at about 4 PM, the AdCom held closed discussions and began the preparation of a draft of this report.

The formal meeting adjourned at approximately 6:00 PM on this date.

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Thursday, 26 January 2006

The AdCom completed the final draft of its report on this meeting. Beginning at about 10 AM, the AdCom presented its report to Richard Buckius (Acting Assistant Director for Engineering) and the NSF SBIR/STTR Program Office team. AdCom members presented each of the items in Section D below, and discussion followed.

The meeting adjourned at approximately 12:00 PM.

3.0 FUTURE MEETING SCHEDULE

The next AdCom meetings are scheduled for:

1) May 20, 2006 8:00 a.m. to 5:00 p.m.
2) January 23-25, 2007 (NSF Headquarters, Arlington, VA)

The May meeting will dovetail with the National SBIR/STTR Conference (May 16-18, 2006) and the OII Grantees conference (May 18-20, 2006), in Louisville KY.

4.0 COMMENTS AND RECOMMENDATIONS

The items below are the specific recommendations of the AdCom:

4.1 VISION

The SBIR/STTR AdCom endorses the amended OII Vision Statement as follows:

> To be the pre-eminent federal resource for *creating* high technology *products and services* through small businesses to stimulate our nation's innovation leadership and contribute to the U.S. economy and society.

4.2 ORGANIZATION

The SBIR/STTR AdCom reviewed several issues presented by the OII regarding organizational and allocation of resources. The discussions are summarized below.

The SBIR/STTR AdCom urges the NSF management to move quickly to name a permanent Director for OII.

The SBIR/STTR AdCom expressed concern regarding the vacancies and turnover within OII, although it was noted that turnover can be positive in that new perspectives are infused into an organization. The SBIR/STTR AdCom endorsed the hiring of Technical Assistants to leverage the time of the program managers. Continued hiring of Technical Assistants is encouraged. Additionally, exit interviews are suggested for departing staff.

The SBIR/STTR AdCom agrees that the OII should hand-off the planning of and participation in the National SBIR/STTR Conference to another entity. This will free up OII staff and funds for other important activities at OII, including portfolio management and mentoring. The decision to not participate in the National SBIR/STTR Conference can be re-addressed in the future.

Joe Hennessey and the SBIR/STTR Program Managers discussed the addition of the four "technical assistants" to the OII office. The hiring of two additional technical assistants is planned in the near future. Termination of NSF's sponsorship of the annual National SBIR/STTR Conference after the fall 2006 event in Milwaukee, WI, will make available additional resources for contractor personnel to perform a broader range of functions than presently performed. These additional functions may include managing the MatchMaker system, and assisting with data compilation and preparation for outcomes evaluation. The work performed by the technical assistants has enabled SBIR/STTR Program Managers to focus more attention on award portfolio management by offloading administrative work associated with proposal review and evaluation.

However, the SBIR/STTR AdCom believes strongly that constraints on SBIR/STTR Program Manager travel budgets are a continuing major problem for OII. Consequently, SBIR/STTR award portfolios have a high risk of severely compromising outcomes through lack of adequate mentoring and oversight. The SBIR/STTR Programs are uniquely handicapped since program resources may not be used to cover administrative costs. The SBIR/STTR AdCom noted that it has cited this problem

frequently in previous meeting reports. The SBIR/STTR AdCom believes that this problem requires the urgent attention of NSF management at the Engineering Directorate and NSF Director levels. The SBIR/STTR AdCom strongly believes OII management is not able to achieve a satisfactory standard for organizational excellence because travel policy constrains management from exercising best practices.

4.3 OPERATIONAL AND PROGRAM MANAGEMENT

The SBIR/STTR AdCom was briefed on the OII preliminary concept to provide bridge funding between Phase I and Phase II projects. The bridge funding would be leveraged with additional cash support. The SBIR/STTR AdCom suggests that the bridge funding concept be more completely developed before implementation. The SBIR/STTR AdCom recommends that more flexible rules be implemented to allow matching funds to be received earlier (perhaps even during Phase I). In addition, reimbursement of small business funds invested prior to the Phase II award date should be allowed to accrue towards matching funds.

The SBIR/STTR AdCom endorses the simplification of the financial negotiations for awards. The presentation from the finance group suggested the implementation of a single indirect rate based on direct labor only for financial analysis and diligence. Some SBIR/STTR AdCom members cautioned that an indirect rate ceiling could place a burden on some small businesses.

The SBIR/STTR AdCom acknowledges the OII proposal regarding the open submission and multiple submissions of Phase IIB proposals. The SBIR/STTR AdCom suggests that these initiatives be implemented with the caveat that the impact on OII staff is not burdensome.

The SBIR/STTR AdCom was briefed regarding the OII format for the upcoming Phase II Grantees Conference. The Grantees conference is directed to multiple goals, including 1) program review, 2) introduction to potential strategic partners, 3) introduction to potential investors, and 4) education. These multiple objectives present a challenge for the OII. The SBIR/STTR AdCom supports the use of the Phase II Grantees Conference to achieve program oversight and the promotion of partnership between its grantees and corporate or venture capital entities, but suggests that the OII clearly position the conference in order to maintain realistic expectations for grantees, investors and strategic partners. The AdCom suggests that a few companies with mature technologies that are ready for higher level VC and or strategic partnership presentations be selected in each of the subject areas to participate in a special open forum with potential investors or partners. The AdCom suggests that the OII leverage external resources such as the Kauffman Foundation, the MIT Enterprise Forum or Springboard Enterprises, Inc. to provide presentation mentoring to the selected firms in order ensure quality presentations. Such a session would benefit both the mature companies and the companies that might be interested in soliciting VC funding at a later date.

The SBIR/STTR AdCom was briefed regarding the OII participation in global outreach. The fact that governments and organizations outside the U.S. are recognizing the role of OII/NSF in innovation is impressive and indicative of excellence and leadership. Furthermore, these global outreach activities can potentially introduce OII to valuable outside approaches. Even though the travel funds for OII staff are paid for by the inviting entity, the SBIR/STTR AdCom is concerned about the “opportunity cost” and distraction on the OII Program Managers and cautions that it be carefully monitored and assessed.

The SBIR/STTR AdCom requests clarification of the legislative language "build in the USA" provision in the SBIR Policy Directive Appendix 1: "…requires that anyone exclusively licensed to sell the invention in the United States must normally manufacture it domestically..."

The SBIR/STTR AdCom enthusiastically endorses plans by the OII to partner with the Kaufman Foundation, and the MIT Enterprise Forum. The AdCom looks forward to the strong benefits expected from these partnerships, and encourages OII to aggressively pursue these partnerships as planned.

4.4 PROMOTING UNIVERSITY-INDUSTRY PARTNERSHIPS

The SBIR/STTR AdCom had considerable discussion regarding ways in which industry-university partnerships should be promoted.

The SBIR/STTR AdCom heard the OII proposal regarding increasing the funding limit of Phase I STTR awards to $150K. While enthusiastic about the proposal as a positive step in advancing the participation of university-small business teams, the SBIR/STTR AdCom recommends that the proposed change in funding be consistent with the SBA rules and guidelines. Specifically, SBA approval should be requested for such a change if it deviates from current rules.

The SBIR/STTR AdCom endorses plans by the OII to promote the participation of SBIR/STTR companies in programs such as 1) Engineering Research Centers, 2) Partnership for Innovation, and 3) GOALI. With the ERC's it has been demonstrated that the NSF has a significant influence on university attitudes and even policies. The AdCom supports OII carefully using its power to encourage a positive change in the attitude of universities toward faculty entrepreneurship, For example, the acceptance of younger, untenured faculty taking a leave of absence to start a company. Having professors with this type of entrepreneurial experience is critical to fostering entrepreneurial students thus planting a seed of innovation. In addition, the SBIR/STTR AdCom recommends additional RFPs requiring multidisciplinary teams consisting of companies and universities.

The SBIR/STTR AdCom suggests that a workshop exploring "best practices" for industry-university partnering be conducted. The workshop could be held in conjunction with or with input from the Kauffman Foundation, the National Academies Government-University-Industry Roundtable, and the MIT Enterprise Forum®.

The SBIR/STTR AdCom recommends as a first step, the dates of the meetings of the National Academies Government-University-Industry Roundtable be determined and the information be disseminated by OII management to the members of the ENG AdCom and SBIR/STTR AdCom.

4.5 SBIR/STTR OUTCOMES: ASSESSMENT AND COMMUNICATION

The SBIR/STTR AdCom commends the OII for its progress and presentation of data on the assessing of outcomes of Phase II/IIB projects.

The SBIR/STTR AdCom recommends that the metrics for success be continually reviewed to ensure that the criteria be set at an appropriate level for this stage of post award analysis. At issue is the cumulative sales at three years and six years as well as profit or breakeven at six years.

The SBIR/STTR AdCom does not feel it necessary to extend assessment beyond the six-year period.

The SBIR/STTR strongly recommends that the Kauffman Foundation, or another equally independent and qualified third party be secured to provide on-going evaluation, measurement and auditing of program outcomes, consistent with the timeframes required by SBA.

4.6 NSF STRATEGIC PLAN

The SBIR/STTR AdCom prepared input for the NSF 2006 - 2011 strategic plan in the format requested at the website below. This input is presented in the attachment to this report.

http://www.nsf.gov/about/performance/input.cfm

4.7 SBIR/STTR ADCOM MAKEUP

The SBIR/STTR AdCom recommends that the OII Acting Director continue to seek university faculty as members.

4.8 CONTRIBUTION TO SBIR/STTR REAUTHORIZATION

The SBIR law requires reauthorization in 2008. The SBIR/STTR AdCom is considering its' potential role in the SBIR reauthorization.

END OF REPORT – ATTACHMENTS FOLLOW

APPENDICES TO NSF SBIR/STTR ADVISORY COMMITTEE REPORT
26 JANUARY 2006

APPENDIX A.
PROMOTING PARTNERSHIPS THAT SUPPORT COMMERCIALIZATION SUCCEESS

The SBIR/STTR AdCom discussed at length ways to promote industry-university partnerships. Policy documents that bear on this matter include the Bayh-Dole Act, and IRS procedure 97-14. The Bayh-Dole Act outlines administration of inventions made with Federal assistance. The Act provides that a university may retain title to inventions conceived or first reduced to practice in performing federally-funded research. The university must adhere to the Act regardless of how little Federal funding was used in conceiving or developing the invention. The university must timely disclose each invention to the government sponsor, and is further subject to compliance with other regulations. In addition, the university must grant the U.S. government a royalty-free license for governmental purposes, give preference to U.S. manufacturers, give preference to U.S. small businesses, and share royalty income with inventors. The university must also periodically give their accounting of patenting and commercialization activity to the U.S. government.

Bayh-Dole was generally intended to encourage commercialization of federally-funded university-based research by giving title to the IP generated by that research to the performing university. Some university contracting offices have, however, been using the act as a negotiating tool to claim that they *must* keep title – which is not true. They may assign, as this excerpt from Bayh-Dole Act guidance published by the Council on Governmental Relations (a university consortium) explains:

> Universities generally apply the same policies and procedures to all inventions made at the institution, whether they result from federal or industrial funding. Of course, the university must comply with certain government reporting and licensing requirements of the Bayh-Dole Act for inventions resulting from federally funded research. Nonetheless, university policies emphasize the university's responsibility to manage all its inventions for the public benefit.
>
> When an invention results from industrially funded research, the sponsoring company is often granted the first opportunity to obtain a license to commercialize the invention. If joint industrial and federal funding is involved, the company's rights are subject to the institution's obligations to the federal government. Whether or not federal funds are involved, the university insists on license terms that require the company to be diligent in developing the invention. If the company does not comply, the university generally reserves the right to terminate the license or to grant licenses to other companies. In this way, a company can be prevented from "shelving" an invention that might replace or compete with one of its existing products.
>
> When both federal and industrial funding support a research program, it is appropriate to grant an industrial sponsor the right to receive licenses to subsequent inventions. The regulations implementing the Bayh-Dole Act specifically recognize this possibility. It is also possible for two separate research projects to contribute to a single invention. If one project is sponsored by industry and one by the federal government, the industrial sponsor can be given rights to the invention.
>
> It is, however, considered inappropriate to grant an industrial sponsor the right to exclusive licenses to future federally assisted inventions which result from research that the company does not fund.
>
> Perhaps the most fundamental boundary is that universities should not grant to a single industrial sponsor the rights to federally assisted inventions from the entire institution or major units such as departments, centers and laboratories. The granting of rights must be specific to the scope of work funded.

From *http://www.cogr.edu/docs/BayhDoleQA.htm*

Internal Revenue Service Procedure 97-14 states, generally, that if a research sponsor is seeking to acquire intellectual property rights to any invention which may emanate from sponsored research, prior to the development of the invention, the sponsor must pay a competitive price for those rights. More directly, it sets forth conditions under which a research agreement does not result in private business use under § 141(b) of the Internal Revenue Code of 1986. It also applies to determinations of whether a research agreement causes the test in § 145(a)(2)(B) of the 1986 Code to be met for qualified 501(c)(3) bonds. In general it applies to universities with substantial publicly-funded research facilities. It seems to be applied too broadly sometimes – in cases where the research to be sponsored uses facilities below the threshold of the 97-14 test for private business use. More on this test follows below.

Concerning 97-14, an issue seems to be that in negotiating terms for sponsoring university research, companies sometimes claim that due to their sponsorship, they have fully paid for the right to use the research results and so are not obliged to subsequently license or pay royalties. Universities counterclaim that companies do not fully pay for facilities, equipment or the expertise of the university's researchers, and point to Procedure 97-14 as requiring payment. Which, if one reads the procedure, one finds that this is only the case if the research passes the private business use test, which is that if more than 10 percent of the proceeds of a qualified 501(c)(3) bond issue are to be used for the research. Although 97-14 is invoked in negotiation by universities, in most cases a university's research facilities would have to be vanishing small or sponsored research programs very large in order for the majority of sponsored research agreements to trigger the 10 percent test.

Further claims and counterclaims include statements by companies reminding universities that the government money used to fund university research facilities arguably came in part from their tax remittances, as well as claims by universities that most projects involve federal government money to some degree, and that federal law prohibits the University from giving away the technology thus developed – which is not really what the Bayh-Dole act says.

Thus the issue, as the AdCom explained, involves (among other factors) providing guidance to clarify and balance the competing claims of universities, industry and government in matters concerning industrially-sponsored university research.

On the one hand, university research organizations are not job-shops engaged in work-for-hire contract research. And by way of clarification of academic and industrial roles, it helps to understand the difference between technology transfer, commercialization, and the less-tangible activities such as generation of degreed technical personnel that are used to generate value from industry-sponsored university research. The different goals require different treatments of intellectual property and know-how generated in sponsored research. However, much difficulty arises when university or industrial contract officers apply rules and models meant for one sort of activity, say technology transfer, to commercialization or other sponsored research activities. Current guidance, such as the COGR comments quoted above, is sometimes insufficient or incomplete in guiding university and industrial contract officers toward workable relationships.

On the other hand, the simultaneous decrease in industrial and government sponsored research in the physical sciences presents a dire problem for important parts of the U.S. economy. Here we offer a

clarification, by way of a 'bigger picture' observation. Interaction with industry presents interesting problems to researchers and students. The associated income from sponsored research at reasonable pricing helps universities fund upgrades to older equipment and replacement of obsolete equipment. Further, healthy and numerous industrial interactions help a given university compete for the ablest minds and the most interesting research among the large number of other universities (not just in the USA) that are doing research in the same technology areas. The approach that universities are taking toward that end largely involves finding state and government grant money to fund that investment. The problem with that is that the level of government investment is not, and never will be, large enough to sustain those research enterprises on a scale that will keep them globally competitive. This slows things down, and talented people sit on their hands and get frustrated in some cases. Why? Because the funding process has political overtones, and so is not necessarily linked to merit or need. The political aspects are not wrong in and of themselves, but the consequence of this state of affairs over time has been that the state and federal sponsors will either under-fund everyone or they will 'cherry pick' among competent grantees, leaving many if not most of the competent wanting for investment—which, ironically, accelerates their technological and academic obsolescence. Those left wanting will find that their research enterprises, given the acceleration in advancement of the frontiers of technology, will more rapidly become obsolete - which, given the need to *increase* talent for researchers, especially in the physical sciences, could be a substantial waste. It will be very difficult to meet society's need for talented researchers when the means to generate those researchers is neither privately nor publicly funded. In addition, with the increase in the strength of economic activity and implementation of technology-based development strategies by governments in China, India and the rest of the Pacific Rim countries is a corresponding increase in incentives for companies to sponsor academic research in those places instead of the United States – in essence, "going where the action is." The immediate impact might be a decrease in industrial sponsorship of academic research, followed by a deterioration of research capability in the academic commons in the US as compared to capabilities overseas.

Comment [AJ1]: This incorporates the gist of remarks from Karen Kerr.

The AdCom discussed the challenges faculty face in trying to commercialize research before they have earned tenure. The AdCom believes that some method of incorporating commercialization successes in tenure decision processes is appropriate and a valid incentive but acknowledges that this is a very controversial idea. We believe this is an idea that deserves further discussion, especially in the context of a new round of ERC proposals.

To reverse this wasteful trend and as part of NSF's role in responding to recent activities, including the National Innovation Initiative, the SBIR/STTR AdCom recommends that a workshop cataloguing "best practices" for industry-university be conducted. The workshop could be held in conjunction with or with input from the Kauffman Foundation, the National Academies' Government-University-Industry Research Roundtable, and interested universities including the MIT Enterprise Forum®, Wisconsin Alumni Research Foundation, The Pennsylvania State University, and others. The point of the workshop will be to share, as appropriate, the content and rationale of successful university-industry research contract arrangements.

APPENDIX B.
NSF STRATEGIC PLAN INPUT

This Appendix is prepared in the format prescribed at:

http://www.nsf.gov/about/performance/input.cfm

1. Does NSF's current Strategic Plan effectively communicate NSF's roles and responsibilities as part of the science and engineering (S&E) community? If not, what is lacking and how can it be improved?

INNOVATION

"Innovation" has taken center stage in the national discussion of our nation's competitiveness in the global economy. Two selected studies on this subject are referenced below:

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"Innovate America," December 2004
(http://www.compete.org/, http://innovateamerica.org)

"Rising Above The Gathering Storm: Energizing and Employing America for a Brighter Economic Future," National Academy of Science
(http://www.nap.edu/catalog/11463.html)
=======

The NSF 2003 - 2008 Strategic Plan cites the term "innovation" in the Vision Statement ("Enabling the Nation's Future through Discovery, Learning and Innovation"). Innovation also is cited in the presentation of two of the four goals (Ideas, Tools), but not for the other two goals (People, Organizational Excellence).

First, it is recommended highly that the new NSF strategic plan retain "innovation" in the Vision Statement, and that priority for it be heightened.

Second, the term innovation is not defined in the 2003 – 2008 strategic plan. Interpretations might range from new approaches for university research to effective technology commercialization. The studies listed above in this section offer widely accepted definitions of innovation that may serve as a useful starting point. Hence, it is recommended highly that the new NSF strategic plan define explicitly what is meant by "innovation."

Third, it is recommended highly that the new NSF strategic plan articulate specific goals for innovation, and include strategies that describe "how" the innovation vision and goals will be achieved.

Fourth, with the growing importance of "innovation" in the nation's science and technology enterprise, it is recommended that NSF consider adding "innovation" as a third criterion (along

with intellectual merit and broader impacts) for use in proposal evaluations. The agency and Engineering Directorate should proceed with plans to transition OII to the Office of Industrial Innovation and Partnerships (IIP) beginning in FY 2007 along with the transfer of other partnership programs into IIP.

It is strongly recommended that the new NSF strategic plan feature the OII/OIP as a key asset in achieving the agency-wide innovation vision and goals as are finally articulated.

ENGINEERING WORKFORCE

The availability of an adequate engineering workforce is an increasingly critical problem for the nation and its science and engineering community. The decline in access to foreign engineers through increased entry barriers to our country and increasingly attractive opportunities in their homelands are major contributing factors.

It is critical that NSF clearly articulate this engineering work force shortage to the education, policy, and broader community, and that it does more to promote engineering as an attractive career option for our best and brightest young people.

Engineering career compensation data is frequently represented inaccurately and/or incompletely by counting only those in a traditional engineering role. This contributes to young people opting out of engineering in favor of more seemingly lucrative and rewarding career professions.

NSF should insure that this compensation data properly reflects engineers who succeed at senior management careers in the industrial sector. The compensation data should especially reflect those engineers that pursue highly successful entrepreneurial ventures, sometimes in a serial mode. The data should be based on total compensation, including salary, stock appreciation, and other components of compensation.

2. What broad characteristics of the near- and long-term environment for S&E research and education should NSF consider and address in its next Strategic Plan?

NSF should nurture more robust partnerships among NSF, other agencies, universities AND the private sector in order to create a more creative, effective and efficient near- and long-term environment for S&E research and education.

The private sector (which employs the majority of S&E graduates) can play a key role in the research and education process. The private sector role becomes more critical with the ever quickening tempo of research to technology commercialization life cycles.

Successful NSF programs that nurture robust partnerships (e.g., SBIR/STTR, PFI, REU/RET) should be leveraged to achieve a stronger S&E research, education and innovation environment throughout NSF. Visionary concepts for additional programs that enable effective partnerships should be solicited and the best of these implemented.

3. Other comments:

The NSF 2003-2008 strategic plan cites "Organizational Excellence" as a goal: ("An agile, innovative organization that fulfills its mission through leadership in state-of-the-art business practices.") While this is a noble goal, explicit strategies for achieving this goal more fully is vital in order to adapt NSF practices and procedures to the rapidly evolving S&E environment and requirements of the 21st century. Specifically, the SBIR/STTR Advisory Committee believes strongly that OII management is not able to achieve satisfactory standard for organizational excellence because travel policy constrains management from exercising best practices.

4. Name:

E. Jennings Taylor – Submitted for NSF SBIR/STTR AdCom

5. Title:

Chair, NSF SBIR/STTR AdCom